



AEROSPACE MATERIAL SPECIFICATION

AMS5542™**REV. R**

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Revised 2024-06

Superseding AMS5542P

Nickel Alloy, Corrosion- and Heat-Resistant, Sheet, Strip, and Plate
72Ni - 15.5Cr - 0.95Cb(Nb) - 2.5Ti - 0.70Al - 7.0Fe (X750)
Annealed

(Composition similar to UNS N07750)

RATIONALE

AMS5542R is the result of a Five-Year Review and update of the specification. The revision updates composition testing and reporting requirements (see 3.1, 3.1.1, 4.2, and Table 1), clarifies finish and bending requirements (see 3.2.1 and 3.3.1.2), adds pyrometry (see 3.3.2), adds strain rate requirements to tensile testing (see 3.3.2.1.2), adds hardness information (see 3.3.2.2 and 8.2), and updates the exceptions requirements (see 3.3.3 and 8.5).

1. SCOPE

1.1 Form

This specification covers a corrosion- and heat-resistant nickel alloy in the form of sheet and strip up to 0.1874 inch (4.76 mm), inclusive, in thickness and plate up to 4.000 inches (101.6 mm), inclusive, in thickness.

1.2 Application

These products have been used typically for parts requiring high strength up to approximately 1500 °F (816 °C) and oxidation resistance up to approximately 1800 °F (980 °C), and for bellows and flat springs requiring optimum resistance to relaxation up to approximately 1000 °F (538 °C) with moderate or relatively low stresses, but usage is not limited to such applications.

1.2.1 Parts may be formed and then heat treated to improve strength at elevated temperatures.

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

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Documents

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2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS2262	Tolerances, Nickel, Nickel Alloy, and Cobalt Alloy Sheet, Strip, and Plate
AMS2269	Chemical Check Analysis Limits, Nickel, Nickel Alloys, and Cobalt Alloys
AMS2283	Composition Testing Methods for Nickel- and Cobalt-Based Alloys
AMS2371	Quality Assurance Sampling and Testing, Corrosion and Heat-Resistant Steels and Alloys, Wrought Products and Forging Stock
AMS2750	Pyrometry
AMS2807	Identification, Carbon and Low-Alloy Steels, Corrosion and Heat-Resistant Steels and Alloys, Sheet, Strip, Plate, and Aircraft Tubing
AS7766	Terms Used in Aerospace Metals Specifications

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM E8/E8M	Tension Testing of Metallic Materials
ASTM E18	Rockwell Hardness of Metallic Materials
ASTM E112	Determining Average Grain Size
ASTM E140	Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, Scleroscope Hardness, and Leeb Hardness
ASTM E290	Bend Testing of Material for Ductility

2.3 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Composition shall conform to the percentages by weight shown in Table 1, determined in accordance with AMS2283 or by other analytical methods acceptable to the purchaser.

Table 1 - Composition

Element	Min	Max
Carbon	--	0.08
Manganese	--	1.00
Silicon	--	0.50
Sulfur	--	0.01
Chromium	14.00	17.00
Columbium (Niobium)	0.70	1.20
Titanium	2.25	2.75
Aluminum	0.40	1.00
Iron	5.00	9.00
Cobalt	--	1.00
Tantalum	--	0.05
Copper	--	0.50
Nickel + Cobalt	70.00	--

3.1.1 The producer may test for any element not listed in Table 1 and include this analysis in the report of 4.4. Reporting of any element not listed in the composition table is not a basis for rejection unless limits of acceptability are specified by the purchaser.

3.1.2 Check Analysis

Composition variations shall meet the applicable requirements of AMS2269.

3.2 Condition

The product shall be supplied in the following condition:

3.2.1 Sheet and Strip

Sheet and strip shall be cold rolled, annealed, and, unless annealing is performed in an atmosphere yielding a bright finish, descaled, producing a uniform finish.

3.2.2 Plate

Plate shall be hot rolled and annealed. When ordered, plate shall be descaled.

3.3 Properties

The product shall conform to the following requirements:

3.3.1 As Annealed

3.3.1.1 Tensile Properties

Tensile properties shall be determined in accordance with ASTM E8/E8M.

3.3.1.1.1 Strip

Tensile properties of strip shall be as shown in Table 2.